GUIDED READING - *Ch. 49 - THE NERVOUS SYSTEM CONTINUED* **NAME:** _____

- **Please print out these pages and HANDWRITE the answers directly on the printouts.** *Typed work or answers on separate sheets of paper will not be accepted.*
- **Importantly, guided readings are NOT GROUP PROJECTS!!!** *You, and you alone, are to answer the questions as you read. You are not to share them with another students or work together on filling it out. Please report any dishonest behavior to your instructor to be dealt with accordingly.*
- **Get in the habit of writing legibly, neatly, and in a NORMAL, MEDIUM-SIZED FONT.** *AP essay readers and I will skip grading anything that cannot be easily and quickly read so start perfect your handwriting.*
- **Please SCAN documents properly and upload them to Archie.** *Avoid taking photographs of or uploading dark, washed out, side ways, or upside down homework. Please use the scanner in the school's media lab if one is not at your disposal and keep completed guides organized in your binder to use as study and review tools.*
- **READ FOR UNDERSTANDING and not merely to complete an assignment.** *Though all the answers are in your textbook, you should try to put answers in your own words, maintaining accuracy and the proper use of terminology, rather than blindly copying the textbook whenever possible.*

Nervous systems consist of circuits of neurons and supporting cells. *[2]*

1. This concept begins with a look at the evolution of nervous systems. You will want to study this to tie in with your study of animal diversity. To master this concept, you will need to be solid in the vocabulary that is used here. Begin by defining these terms. [2]

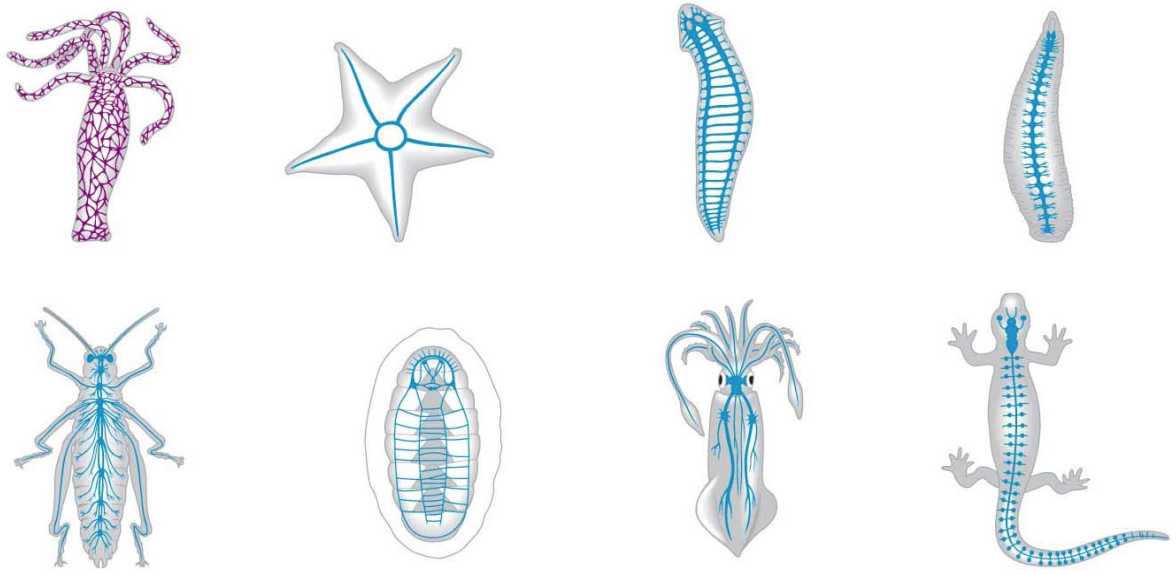
   nerve net

   nerve

   cephalization

   ganglia

2. For the animals sketched below, give the **common name of the organism and its phylum**. Also jot down the important **features of its nervous system**. [2]



3. a. Which phylum has a **nerve net**? _____ [2]

   b. Is the first phylum to show **cephalization**? _____ [2]

   c. Has a **ventral nerve cord**? _____ [2]

   d. Has a **dorsal nerve cord**? _____ [2]

4. What are the two components of **the central nervous system**? [2] Explain the general **role of each component**.

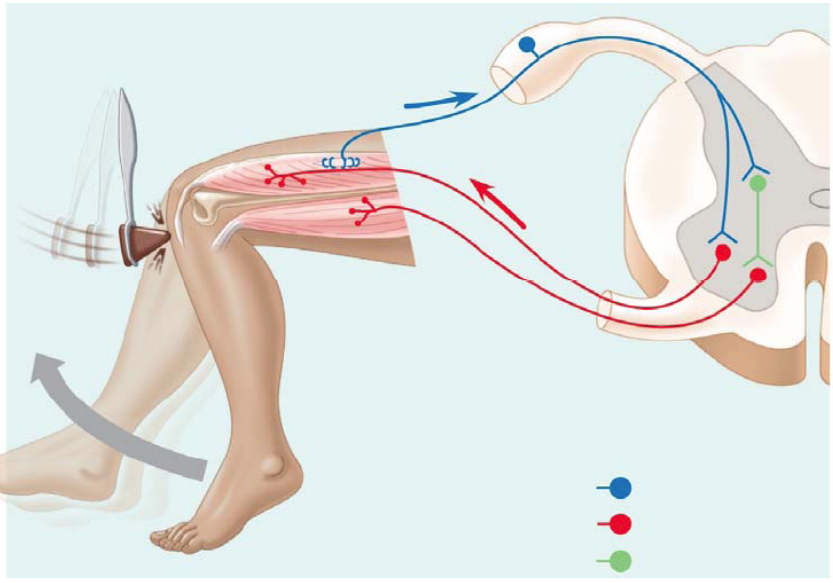
   1.

   2.

5. a. What is a **reflex**?

   b. Give two **examples of reflex responses**. [2]

6. **A reflex arc** is illustrated and explained in Figure 49.3. It is important for you to understand this pathway, so take some time with the figure below. Label the following: *stimulus, receptors (sensors), sensory neuron, interneuron, spinal cord, gray matter, white matter, motor neuron, effector (muscle). I[2]*



7. a. In vertebrate chordates, what embryological structure **develops into the brain and spinal cord**?

   b. What does the **hollow cavity of the embryological nerve cord** form?

   c. What is **cerebrospinal fluid**?

d. Where is **cerebrospinal fluid found**?

e. What is the **function of cerebrospinal fluid in mammals**? [2]

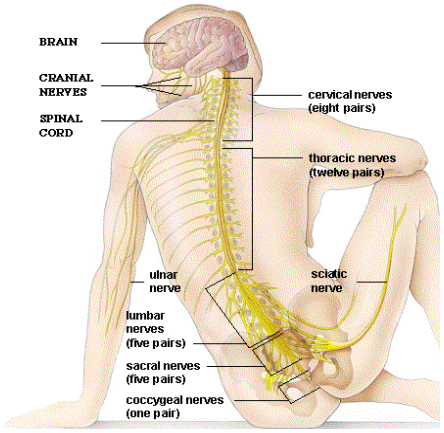
8. Distinguish between **white matter and gray matter**. [2]

9. **Neurons conduct nerve impulses.** What are the specialized support cells that have other **functions, including myelination, structural support, removal of released neurotransmitters, and protection**? [2]

10. What is the **blood brain barrier**, how does it form, and what is its evolutionary significance?

11. a. What makes up the **peripheral nervous system (PNS**)? [2]

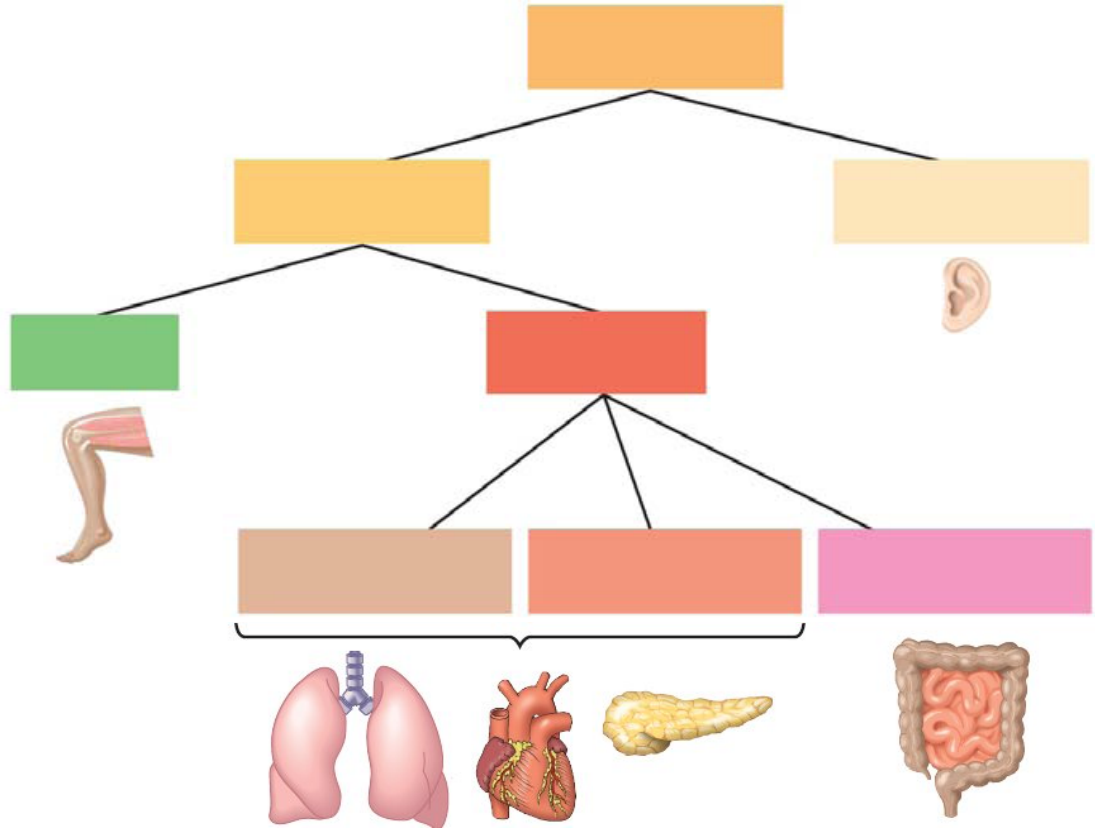
b. What is the function of the PNS? [2]



12. a. Distinguish between **afferent and efferent neurons**.

b. Go back to the figure in question 6, and correctly label the afferent and efferent neurons.

13. a. Figure 49.7 shows the **branches of the peripheral nervous system**. Label these branches. [2] *Know this well!*



b. What is the major **difference between the motor system and the autonomic nervous systems of the PNS**?

c. Which branch is sometimes called the "**voluntary nervous system**"? Include this term on the diagram [2]

d. Which branch is often termed the "**involuntary nervous system**"? Include this term on the diagram. [2]

e. **The sympathetic and parasympathetic divisions of the autonomic nervous system have largely antagonistic (opposite) functions in regulating organ function**. Describe the functions of each.

Sympathetic Division of Autonomic PNS

Parasympathetic Division of Autonomic PNS

f. What is the function of the **Enteric Division of the Autonomic PNS**?

14. a. What would be **the effect of stimulation by the sympathetic nervous system on….** [2]

i. Heart rate?

ii. The bronchi of lungs?

iii. The pupils?

iv. The bladder?

v. The stomach and intestines?

vi. The glucose released by the liver?

b. What would be **the effect of stimulation by the parasympathetic nervous system on…** [2]

i. Paristalsis?

ii. Heart rate?

iii. The stomachs, intestines, and other organs involved in digestion?

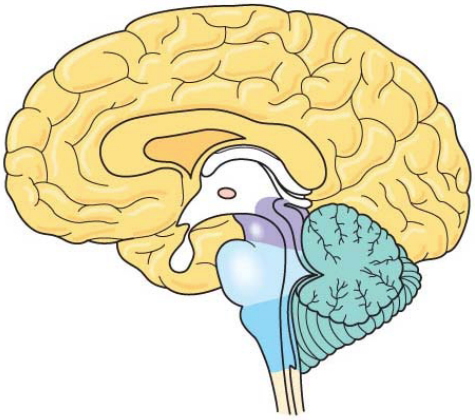
15. a. Which division of your autonomic nervous system would likely be activated if you learned that an exam you had forgotten about would start in 5 minutes? Explain your answer. [1]

b. Now, take the question above a step further, and describe the specific physiological responses that would occur. [2]

Though you should read over the next two sections to gather and reinforce the big picture, I ask that you concentrate your studying on the information in the course slides where I have outlined all of the information you should know.

The vertebrate brain is regionally specialized. *[2]*

16. Label the following structures on the figure of the brain, and give a **primary function** of each labeled structure. [2]



a. **Brainstem** (which includes the midbrain, pons, medulla)

b. **Cerebrum**

c. **Cerebellum**

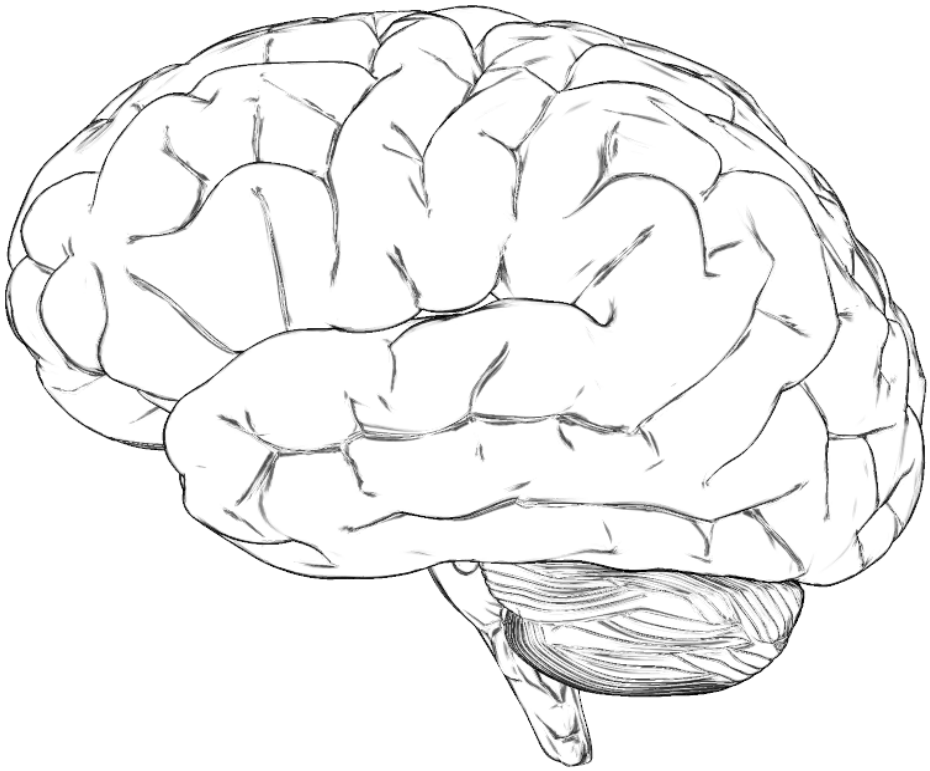
d. **Thalamus**

e. **Hypothalamus**

17. Label the **pituitary gland** on the figure above. [2]

The cerebral cortex controls voluntary movement and cognitive functions. *[2]*

18. On the brain figure, use a colored pencil to sketch in and label the **four lobes of the cortex as well as the areas of specialized function within each lobe**. Then, describe the functions centered in each lobe below. [2]



a.

b.

c.

d.

Chapter 49 deals with many fascinating topics related to the nervous system and brain, but many of these topics go beyond the scope of a typical AP Biology course.

You will find much of the information presented very interesting. Schizophrenia, depression, addictive behavior, Alzheimer's, and Parkinson's are all conditions we have seen in people we know.

Read on for more information about each of them. [2]

19. Please answer the Self-Quiz at the end of your chapter. *Do your best to try it from memory first in order to test how well you grasped the material.*

1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____

References

1. Campbell *et al*. (2008). AP* Edition Biology. 8th Ed. San Francisco: Pearson Benjamin Cummings.
2. Adapted from Fred and Theresa Holtzclaw